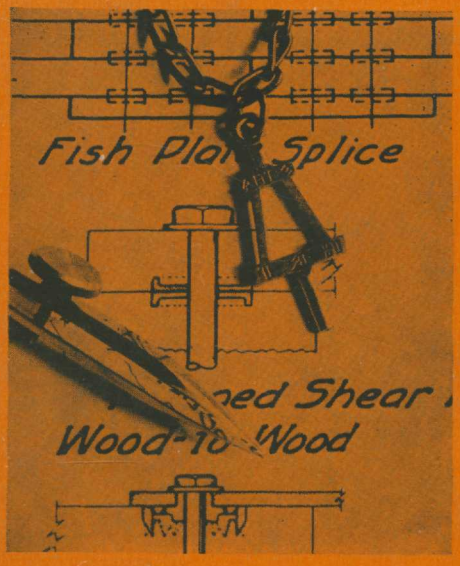

THE OHIO STATE ENGINEER

MEMBER
ENGINEERING
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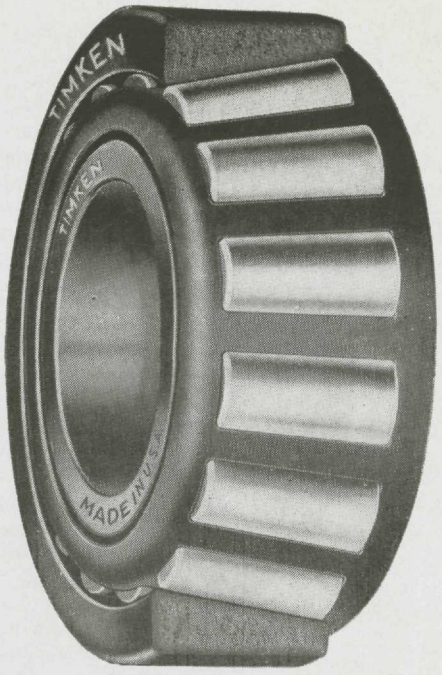
Price 15c

February, 1945

Know Timken Bearings-
Be a better engineer



Application

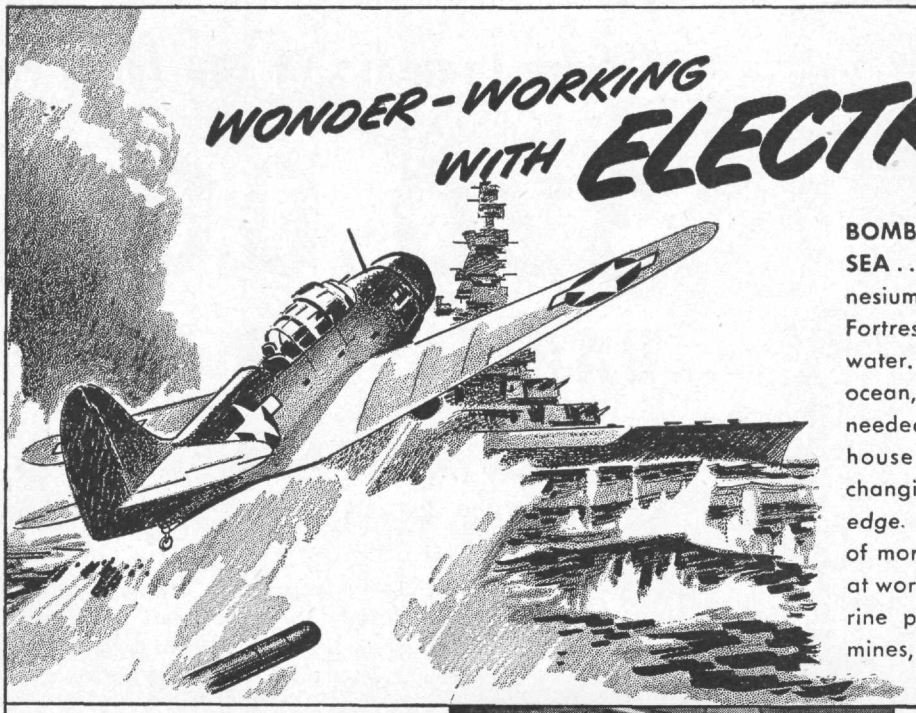
Design, material and manufacturing precision are all vital factors in the outstanding success of the Timken Tapered Roller Bearing; but our engineering experience in applying Timken Bearings to every kind of mechanical equipment — extending over more than three decades — is of equal importance in assuring consistently superior performance wherever Timken Bearings are used.

Just as we pioneered the tapered roller bearing itself, so we have pioneered its use in industry after industry, until today there is hardly a single industry or type of equipment in which Timken Bearings are not employed and *preferred* for their versatility in eliminating friction; carrying radial, thrust and combined loads; and holding moving parts in correct and constant alignment.

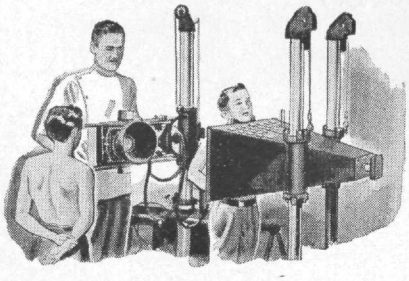
Through many years of adapting Timken Bearings to thousands of different kinds of machines, we have learned how to make the utmost of their varied abilities; how to take full advantage of their unusual qualities. The value of this experience to the designing engineer cannot be overemphasized; it cannot be bought; but when your student days are over and you enter the industrial field as a graduate engineer, our combined experience in designing, manufacturing and applying Timken Tapered Roller Bearings will be at your disposal to help you solve your bearing problems, whatever they may be. Furthermore, we stand back of every Timken Bearing application that is approved by our Engineering Department. It *must* work to the complete satisfaction of the user. The Timken Roller Bearing Company, Canton 6, Ohio.

TIMKEN
TRADE-MARK REG. U. S. PAT. OFF.
TAPERED ROLLER BEARINGS

WONDER-WORKING WITH ELECTRONS

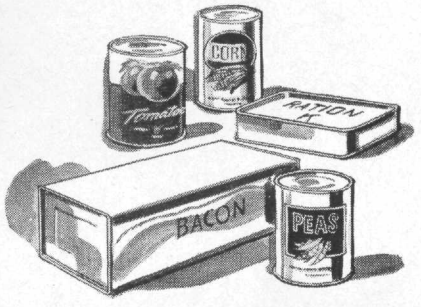


BOMBERS FROM THE BOTTOM OF THE SEA . . . There's a fabulous amount of magnesium . . . enough for 4,000,000 Flying Fortresses . . . in every cubic mile of sea water. To extract this vital metal from the ocean, vast quantities of d-c electricity are needed. An electronic device, the Westinghouse Ignitron, supplies this current by changing a-c to d-c — *right at the water's edge*. Ignitrons, with a combined capacity of more than 3,000,000 kilowatts, are now at work in magnesium, aluminum and chlorine plants, in electric railway systems, in mines, in many war industries.

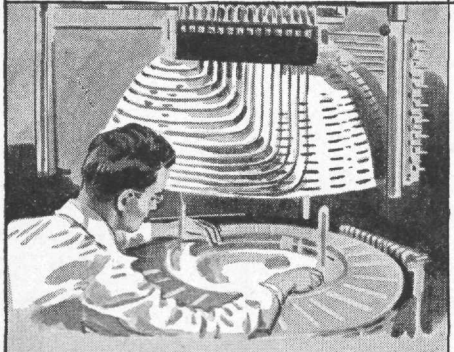


A NEW X-RAY machine, built by Westinghouse, makes possible the examination of 1000 school children daily — for symptoms of tuberculosis. *X-ray pictures are taken* by a 35 mm candid camera — at a cost of less than 1¢ per exposure.

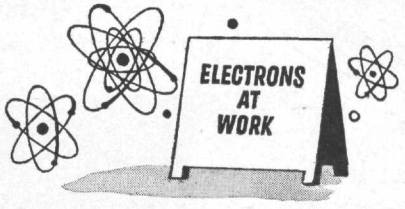
DUST TAKES A HOLIDAY . . . Dust-free air is absolutely essential in the assembly of optical equipment for our fighting forces. *The Westinghouse Precipitron* electronic air* cleaner automatically removes dust particles down to the size of *1/250,000th* of an inch.



S-T-R-E-T-C-H-I-N-G THE TIN SUPPLY . . . Electronic high-frequency induction heating — developed by Westinghouse — helps save *two-thirds* of our war-scarce tin supply by flowing a protective tin coating, only 30-millionths of an inch thick, on steel strip.

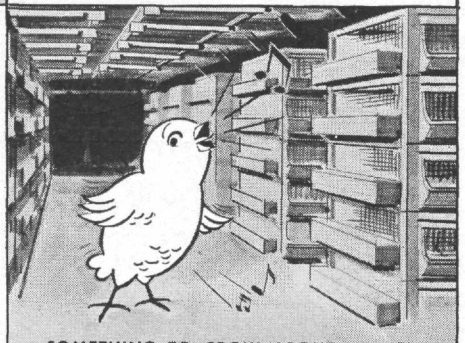


ELECTRONIC CHEMIST . . . The Westinghouse Mass Spectrometer analyzes intricate gas mixtures at amazing speed. In making synthetic rubber, for example, this electronic device cuts the time of chemical analysis from *days* to a matter of *minutes*.



Although one of the tiniest things in the universe, the electron is a gigantic force for the good of mankind. It is helping us to win the greatest war in history. It speeds production of goods for war and peace . . . brings entertainment into our homes . . . contributes to our health and happiness in countless ways. *And wherever you find electrons at work you will find Westinghouse electronic research at the forefront!*

*TRADE MARK REG. U.S. PAT. OFF.

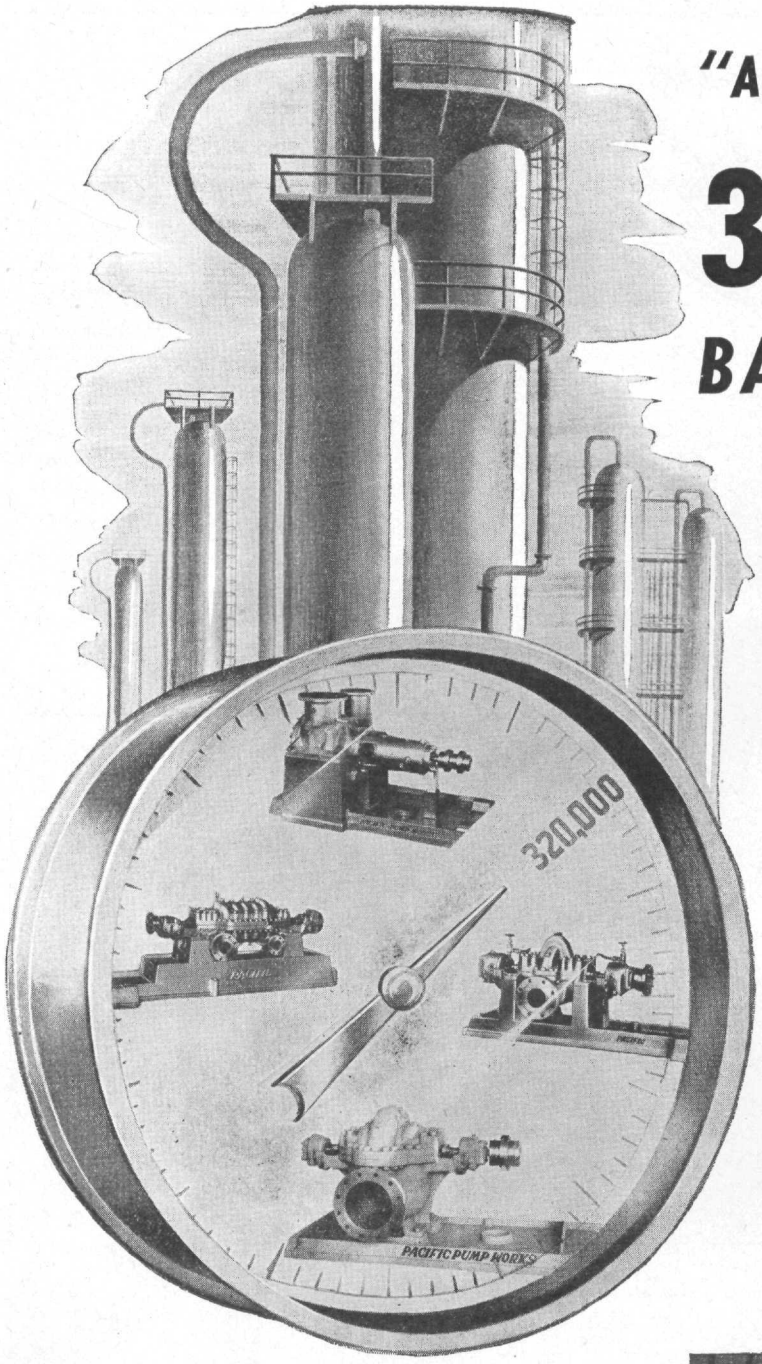


SOMETHING TO CROW ABOUT . . . The Westinghouse Sterilamp*, an electronic device, deals sudden death to air-borne bacteria in brooder batteries — *has reduced chick mortality by 50%*. Sterilamps are widely used in restaurants, canneries, breweries, and many other industries.

Tune in:
JOHN CHARLES THOMAS
Sunday 2:30 pm, EWT, NBC

Westinghouse
PLANTS IN 25 CITIES OFFICES EVERYWHERE

Tune in: TED MALONE
Mon. Tues. Wed. Evening,
Blue Network



Clark 800 BHP "Angles"

Five 8-Cylinder 800 BHP Clark Super 2-Cycle Angle Compressors are in service in the combination gasoline plant and gas booster station of the El Paso Natural Gas Company at Jal, New Mexico.

In less than five years, nearly 50,000 BHP of Clark "Angles" have been installed by natural gas companies as gas driven natural gas compressors.

"Two of the Dresser Industries"

"Achievements in the Field"

320,000
BARRELS PER HOUR

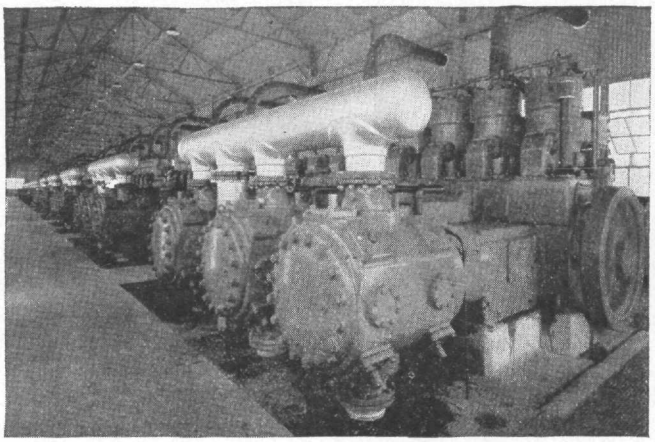
PACIFIC'S ANSWER TO A GREAT PUMPING PROBLEM

CIRCULATING hydrocarbon fluids at the rate of 320,000 barrels per hour, day in and day out—accurately meeting, with efficiency and economy, the countless variations in flow conditions encountered in the manufacture of essential aviation gasoline, synthetic rubber and other allied products . . . this is the function of Pacific Engineered Centrifugal Pumps installed in the new, modern Cities Service Refinery, recently completed and now in operation at Lake Charles, Louisiana.

Pacific was chosen because of its unsurpassed range of types and sizes, developed and imbricated to insure the highest pumping efficiency, widest operating economy and greatest margin of safety. Correct design and construction provide incredible endurance even under the most severe conditions. Performance records prove this!

PACIFIC PUMPS, INC.
Huntington Park, Calif.

PACIFIC PUMPS, INC.
Mid-Continent Division, Tulsa, Okla.



Clark Compressors in El Paso Natural Gas Company Plant, Jal, N. Mex.

CLARK BROS. CO., INC. • OLEAN, N. Y.

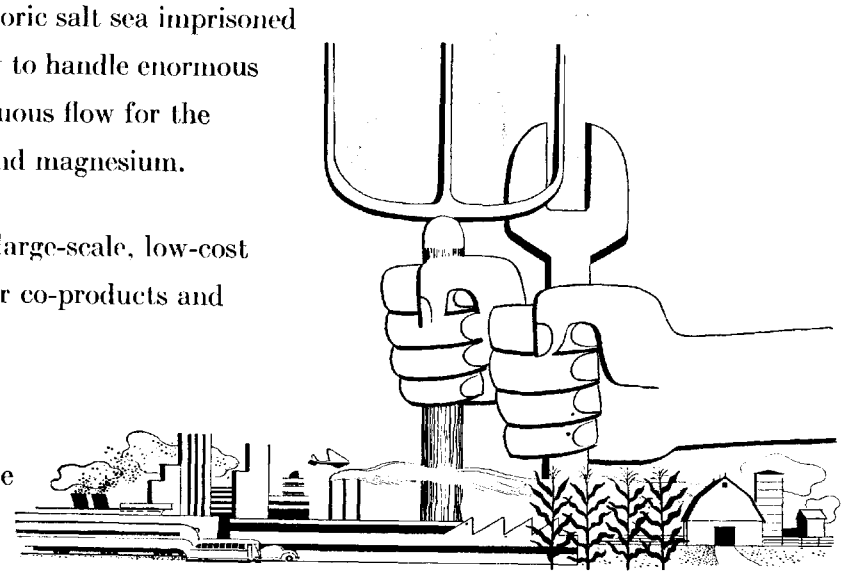
New York, N. Y. . . Chicago, Ill. . . Houston, Tex. . , Tulsa, Okla. . . Boston, Mass. . . Huntington Park, Calif.

Lessons Learned

by The Dow Chemical Company for the advancement of industry

College students majoring in chemistry and other technical subjects find special interest in Dow developments. Here are some of the things Dow has learned how to do as producer of more than 500 chemicals essential to industry:

How to specialize in the chemistry of brine by recovering bromine, chlorine, magnesium and other chemicals from a prehistoric salt sea imprisoned far below the surface of the earth—how to handle enormous volumes of ocean water in continuous flow for the recovery of both bromine and magnesium.



How to develop original processes for large-scale, low-cost production of these chemicals, their co-products and related materials.

How to develop plastic materials—Ethocel, Styron, Saran—with distinctive properties of varied usefulness.

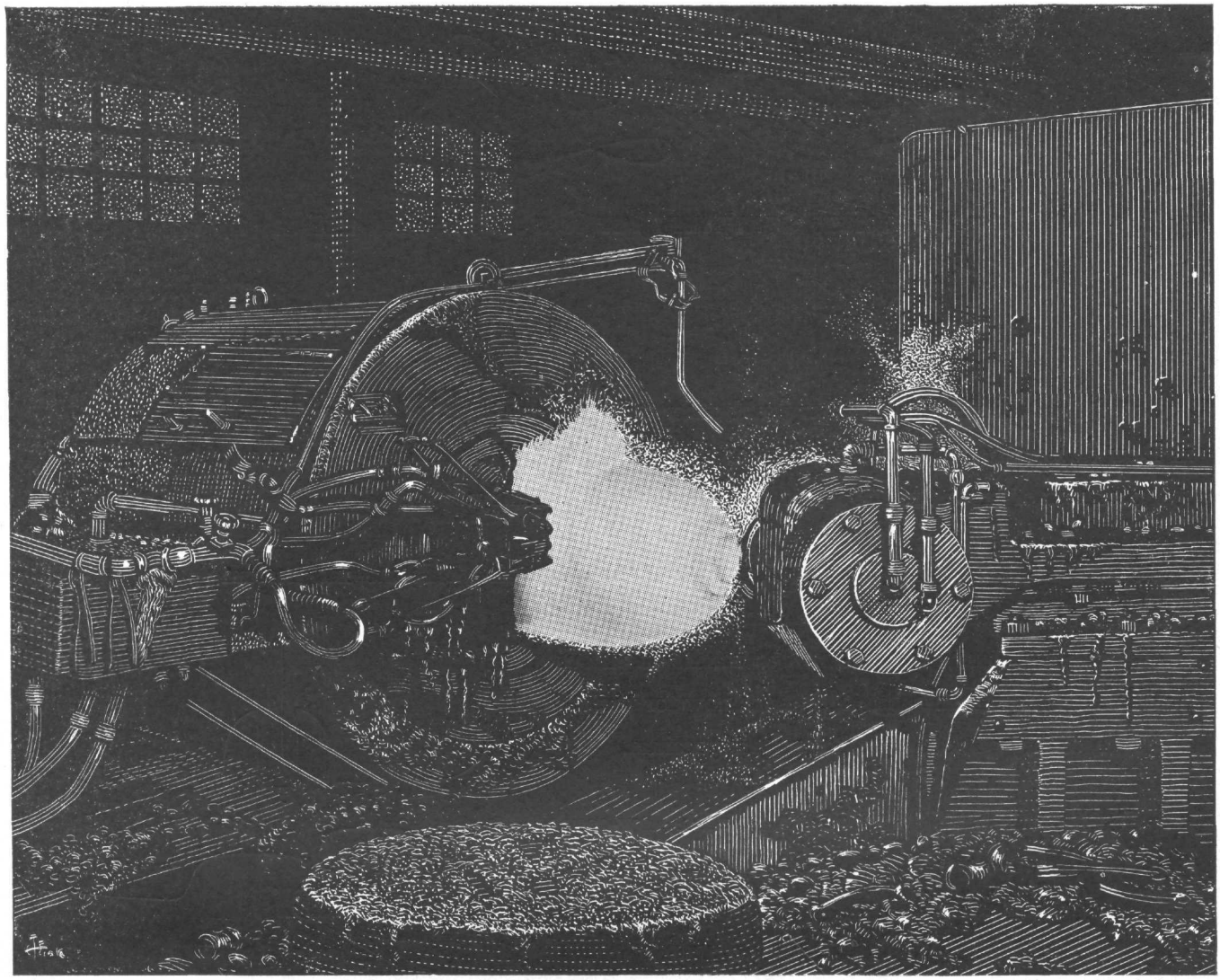
How to develop Dowmetal Magnesium Alloys to give the lightest of structural metals strength, ductility and other essential qualities.

How to fabricate magnesium, aptly called the Metal of Motion.

Such constructive tasks for the advancement of industry provide a fascinating field for men interested in industrial chemistry as a life work. Dow draws heavily on college men to recruit its large staff of technicians and technically trained service and sales employees.

THE DOW CHEMICAL COMPANY, MIDLAND, MICHIGAN
New York • Boston • Philadelphia • Washington • Cleveland • Detroit • Chicago
St. Louis • Houston • San Francisco • Los Angeles • Seattle

DOW
CHEMICALS INDISPENSABLE TO INDUSTRY AND VICTORY



Courtesy of Scaife Company

Birth of a "blitz-bundle"...

Here's how the metal nose of an aerial bomb is formed. A white-hot metal tube, whirling rapidly in a chuck, is brought into contact with a spinning roller. Remotely-controlled movement of this forming roller gradually molds the tube-end into the required rounded contour.

Throughout this forming operation, the tube must be held at uniform temperature — high enough to keep the metal in a plastic condition. Ordinarily, the mass of metal in the chuck tends to draw heat away from the bomb. However, by using Airco oxy-acetylene flame torches for supplementary heating, the spinning bomb is kept at a high, constant temperature, which facilitates forming and helps assure uniform wall thickness in the business end of the bomb.

This is only one of many ways in which the oxyacetylene flame is speeding wartime metal-working. It also shape cuts steel, cleans it, softens it, hardens its wearing surfaces, and welds it and other metals into strong, one-piece parts. Teamed with the electric arc this versatile "tool" has blazed new short-cuts in metal fabrication . . . short-cuts that are pointing the way to better, stronger metal products for peacetime use.

If you would like to receive our informative publication, "Airco in the News," we shall be glad to send a free copy. Write to Mr. G. Van Alstyne, Dept. C. P., Air Reduction, 60 East 42nd Street, New York 17, N.Y.

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The OHIO STATE ENGINEER

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Our Cover

Since this issue was edited by Tau Beta Pi, it is fitting that the engineering symbol of the Tau Beta Pi key be used as the cover design.

Our Frontispiece

Spire of Sound—KDKA radio antenna at Allison Park.

—Courtesy Westinghouse.

E. Joseph Weiss, Ernest C. Grabill } Co-Editors

Kennard L. Wing, *Bus. Mgr.*

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